ASSIGNMENT 3

Textbook Assignment: "Structural Steel Terms/Layout and Fabrication of Steel and Pipe," pages 3-1 through 3-29.

Learning Objective: Identify structural steel members by appropriate terminology and recognize steel structural erection rocedures.

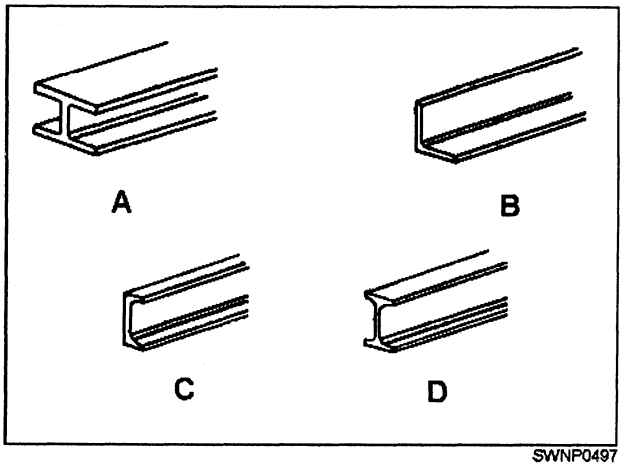

Figure 3A

IN ANSWERING QUESTIONS 3-1 AND 3-2, REFER TO FIGURE 3A.

3-1, What structural shape does the designation W6 x 13 fit best?

1. A
2. B
3. C
4. D

3-2. What structural shape does the classification S15 x 42.9 indicate?

1. A
2. B
3. C
4. D

3-3. A piece of steel plate 3 feet square weighs 180 pounds. What is the classification of this plate?

1. 10-pound plate
2. 20-pound plate
3. 30-pound plate
4. 40-pound plate

3-4. A 10-foot piece of steel that is 3/8-inch thick and 2 inches wide is classified as a

1. bar
2. strip
3. sheet
4. plate

3-5. What sequence is the proper order you should follow for the erection of structural members?

1. Girders, bearing plates, anchor bolts, columns, beams
2. Anchor bolts, column plates, girders, bearing plates, beams
3. Anchor bolts, bearing plates, columns, girders, beams
4. Bearing plates, anchor bolts, columns, girders, beams

3-6. When cutting the holes in bearing plates to receive anchor bolts, you cut the holes larger than the bolts for what reason?

1. To allow for height adjustment
2. To permit lateral adjustment
3. To compensate for angle connections
4. To allow space for welding of columns

3-7. Bearing plates are brought to their proper levels by

1. installing shim packs
2. welding the plates to the bearing plates
3. forcing the grout under the bearing plates
4. using locknuts

3-8. What structural shapes are most often used in columns?

1. Standard beam
2. Tee shapes
3. Pipes
4. Wide flange beam

3-9. What structural steel member is used primarily to span from column to column horizontally?

1. Beam
2. Truss
3. Girder
4. Column splices

3-10. Which of the following members form a lightweight, long-span system used as floor supports and built-up roofing supports?

1. Bar joist
2. Truss
3. Beam
4. Girder

3-11. Workers have installed diagonal braces between bays of a truss system. Their next step is to secure the roof system with what structural members?

1. Angle ties
2. Sway frame
3. Diagonal locking bars
4. Bottom chord extensions

3-12. When using purlins to span roof trusses, you should ensure the legs face in what direction?

1. Up toward the center or apex of the roof
2. Flat with the face of the channel face directly toward the truss
3. Downward with both legs welded to the truss
4. Outward or down toward the slope of the truss system

3-13. What structural members are used to frame the sides of a building which are attached to the outside perimeter columns?

1. Eave struts
2. Purlins
3. Girts
4. Ridge plates

Learning Objective: Identify methods of fabricating plate and structural shapes and the procedures for cutting, forming, and joining plate steel and structural steel shapes.

3-14. When laying out a plate with many parts, you must consider which of the following factors?

1. Time required
2. Economic use of material
3. Accuracy of measurements
4. All of the above

3-15. A job has been laid out and is determined to be accurate. At this time, what modification should be made to all cutting lines?

1. Cut them with a torch on the inside of the kerf
2. Center punch, then cut them with the kerf on the outside edge of the reference lines
3. Transfer to patterns before cutting them so the work can be checked after cutting
4. Lightly paint them to preserve the layout lines

3-16. When a 10-inch beam is connected to a 10-inch girder with the web of one end butted to the side of the other, the required layout is indicated by what letter?

1. A
2. B
3. E
4. H

3-17. The beam S 12 x 35 encloses the girder W 10 x 39, and it extends above the girder 2 inches. The beam butts the girder together at the center line of the girder. The bottom flange is flush with the bottom of the girder flange. What layout is required?

1. C
2. F
3. G
4. H

3-18. As the webs of the girder W 10 x 39 and beam S 8 x 23 are connected and welded, what beam connection layout must be used for the beam S 8 x 23? (The top flange is flush.)

1. A
2. B
3. D
4. E

Learning Objective: Identify the procedures for laying out structural members.

3-19. Which of the following conditions must exist before you lay out steel members ?

1. Adequate lighting
2. All required tools are on hand
3. An accurate field drawing or sketch
4. All of the above

3-20. Structural shapes are more difficult to lay out than plate because the reference lines are not always visible.

1. True
2. False

3-21. When two beams of equal dimensions are fitted together, coping is required so one will butt up against the web of the other. You can determine the size of cope needed

1. by dividing the flange width by 1/8, then adding 1/16 inch
2. by dividing the flange width by 1/2, then subtracting 1/2 of the thickness of the web and adding 1/16 inch
3. by dividing the flange width by 1/4, then adding 1/8 inch
4. by dividing the flange width by 1/2, then adding 1/2 of the thickness of the web and subtracting 1/16 inch

3-22. The legs used to attach to intersecting steel to make a connection are referred to as

1. connection legs
2. web legs
3. fit-up legs
4. gauges

3-23. Outstanding legs are the legs of the angles that attach the supporting angle or intersected steel beam.

1. True
2. False

3-24. The lines in which holes in the angle legs are drilled are known as what type of lines?

1. Dimension
2. Layout
3. Gauge
4. Drill

3-25. On what part of a connection angle does the distance from the heel of the angle to the first gauge line remain constant?

1. Web leg gauge
2. Outstanding leg
3. Gauge line
4. Top flange

3-26. The standard 3-inch distance between the holes on any gauge line is known as

1. leg gauge
2. pitch
3. web leg gauge
4. dimension angle

3-27. When a beam is joined to the flange of a vertical member, you should use what type of connection?

1. Cap plate
2. Direct insert
3. Seated
4. Slotted angle

Learning Objective: Identify procedures for laying out proposed metalwork.

3-28. A template is to be used as the pattern for the construction of a large number of precision metal parts. This template should be made of what material?

1. Graph paper
2. Plain white paper
3. Template paper
4. Metal

3-29. When using templates to help lay out a steel member, you should make sure the identifying marks on the templates and the member correspond to which of the following plans or drawings?

1. Erection
2. Detail
3. Flat
4. Field

3-30. What information does the erection mark on a member provide?

1. The location of the member during erection
2. Date of fabrication
3. The sequence of erection
4. The erection completion date

Learning Objective: Identify pipe layout operations, procedures in constructing design patterns for pipe, and methods of joining pipe into different arrangements.

3-31. To fabricate 25 pieces of pipe of the same diameter and layout dimensions, you should use the shop method of making templates.

1. True
2. False

3-32. When quartering a pipe before proceeding to lay out a joint, you should place the inside angle of the framing square against the pipe after taking what action?

1. Leveling one leg of the framing square
2. Blocking one leg of the framing square
3. Blocking the pipe
4. Leveling the pipe

3-33. What is the first step in developing a template layout for pipe?

1. Drawing a circle equal to the outside diameter of the pipe
2. Constructing the template angle equal to twice the angle of the turn
3. Dividing the circumference of the projected view by one half
4. Bisecting the template angle

3-34. The curve in view C of textbook figure 3-45 is determined

1. by spacing the perpendicular line in view C to equal the outside dimension of view A
2. by extending the line a-i in view C
3. by basing the length of the perpendicular lines in view C on 1/2 of the length of the outside diameter of view A
4* by joining in a smooth curve the set of points formed by the intersection of perpendicular lines drawn from the base line with parallel lines drawn from the point on a-i

3-35. In makinq a simple miter turn, you perform what step after determining the cutback measurement?

1. Measure one half of the distance to the cutback on the vertical plane
2. Mark one half off the cutback measurement along the center line on top of the pipe
3. Lock the protractor blade
4. Determine the outside radius of the pipe

3-36. Assume you are making a full-sized drawing to determine the cut necessary for a two-piece welded turn where the angle of turn of the pipe is 60 degrees. First, you should draw the center lines to intersect as shown in textbook figure 3-46. Then you should

1. lay the pipe over the drawing so its center line will intersect point b
2. lay the pipe over the drawing so its edges will intersect points d and e
3. draw lines a-b-c-d
4. draw the outlines of the pipes

3-37. In view A of textbook figure 3-49, the distance 1-P is equal to

1. the diameter of the pipe
2. the radius of the pipe
3. the thickness of the pipe wall
4. double the thickness of the pipe wall

3-38. In what position should the protractor be locked to show the number of degrees of turnaway from the header to fabricate a branch-to-header connection of equal diameter pipe?

1. At an angle equal to the degree of turnaway
2. At half of the angle of turnaway
3. At one third of the angle of turnaway
4. At one fourth of the angle of turnaway

3-39. In textbook figure 3-50, the cutback measurements for laying out the end of the branch are the distances represented by what letters?

1. EC and AB
2. AB and BC
3. DA and EC
4. BC and DA

3-40. Refer to textbook figure 3-51. Where a branch is welded to a large header, what should be the distance on each side of the branch between points A and B?

1. Same as or a little more than the thickness of the branch wall
2. Same as or a little less than the thickness of the branch wall
3. Same as or a little more than the thickness of the header wall
4. Same as or a little less than the thickness of the header wall

3-41. In fabricating a three-piece connection of equal diameter pipe, you must decide upon the size of the open angle between each pair of center lines for what reason?

1. To determine the position of the center lines
2. To determine the angle of the adjoining sides of adjacent branches
3. To quarter the ends of the three pieces of pipe
4. To apply circumferential lines to each piece of pipe

IN ANSWERING QUESTION 3-42, REFER TO TEXTBOOK FIGURE 3-54 AND TABLE 3-2.

3-42. Of the following paired cutback measurements, which belongs to angle ACG?

1. AB = 1/16 inch and FE = 6 inches
2. AB = 1 1/16 inches and FE = 4 1/8 inches
3. FE = 6 inches and ED = 4 1/8 inches
4. FE = 1/16 inches and CD = 6 inches

3-43. Refer to textbook figure 3-54. Without the use of templates or tables, how do you locate point B of the true Y?

1. By determining the vertex of the triangle ABC
2. By constructing a perpendicular line from point D to bisect line AC
3. By intersecting the center lines of the three pipes
4. By intersecting lines AB and BC

3-44. In the preparation of an orange peel template, such as the one shown in textbook figure 3-57, which of the following projection lines are taken from view A?

1. B-C and A1-B1
2. A-B and B-B1
3. B-B1 and X-Xl
4. A1-B1 and X-X2

3-45. When cutting a pipe with a hand torch, you use what type of cutting process to hold the cutting torch perpendicular to the interior center line of the pipe at every point?

1. Miter
2. Radial
3. Reverse
4. Concentric

Learning Objective: Identify procedures for pipe bending, including heat bending and wrinkle bending.

3-46. What are the flange spiders of a center line template made of wire used for in pipe bending?

1. To clamp the ends of the wire
2. To maintain a constant clearance around the pipe
3. To indicate pipe clearance
4. To indicate the center line of the pipe

3-47. Before heating a pipe, what action, if any, should you take to prevent a reduction in the cross-section area of a hot-bend pipe?

1. Pack it with wet sand
2. Pack it with dry sand
3. Pack it with wet packing
4. None

3-48. What is the technique for applying heat to the bend area of the pipe shown in textbook figure 3-62?

1. First, heat ends A and B, then the part in between
2. First, heat the area midway between A and B, then the ends
3. First, heat the outside (heel) of the bend, then the inside (throat)
4. First, heat the inside (throat) of the bend, then the outside (heel)

3-49. Flat spots in hot-bent copper pipe are caused by which of the following factors?

1. Improper heating
2. Not enough support for the pipe wall
3. Stretch in the outside (heel) of the bend
4. All of the above

3-50. The use of which of the following bending techniques should prevent wrinkles and flat spots in properly packed and heated copper pipe?

1. Bending so all the stretch takes place at the center of the bend area, none on the ends
2. Bending so all the stretch takes place at the ends of the bend area, none at the center
3. Bending so more of the stretch takes place at the center of the bend area than at the other end
4. Dividing the bend area into segments, then bending one segment at a time so stretching is evenly spread over the entire area

3-51. In bending steel pipe, you can control wrinkles and flat spots at the throat of a bend by over-bending, then pulling the end back to round out the flat spot.

1. True
2. False

3-52. Pipe made of what material is likely to break if overbent and then pulled back?

1. Steel
2. Brass
3. Copper
4. Aluminum

3-53. In hot bending aluminum pipe with a torch, you should use which of the following techniques?

1. Keep the flame on the throat while the pipe is being bent
2. Heat only the throat of the bend and avoid overheating
3. Notice changes in heat color to determine the proper bending temperature
4. Overheat then remove heat when bending starts

3-54. When using the wrinkle-bending technique to make a 60-degree bend in a pipe, you should make a total of how many wrinkles to keep from buckling the pipe?

1. One or two
2. Two or three
3. Three or four
4. Five or more

3-55. What technique should you use to wrinkle-bend a 12-inch-diameter pipe?

1. With one torch, heat a strip about 2 feet long and 2 to 3 inches wide along the throat of the planned bend
2. With one torch, heat a strip about 2 feet long and 2 to 3 inches wide along the heel of the planned bend
3. With more than one torch, heat a strip about 2 feet long and 2 to 3 inches wide along the throat of the planned bend
4. With more than one torch, heat a strip about 2/3 of the circumference of the pipe, and 2 to 3 inches wide along the throat of the planned bend

3-56. When bending a heated pipe, you should use what technique, if any?

1. While holding one end of the pipe firmly in position, lift the other end
2. While holding the midpoint of the pipe on the ground, lift both ends at the same time
3. While holding the midpoint of the pipe on the ground, lift one end then the other
4. None